

Understanding the Charter School Special Education Gap: Evidence from Denver, Colorado

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About the Center on Reinventing Public Education

Through research and policy analysis, CRPE seeks ways to make public education more effective, especially for America's disadvantaged students. We help redesign governance, oversight, and dynamic education delivery systems to make it possible for great educators to do their best work with students and to create a wide range of high-quality public school options for families.

Our work emphasizes evidence over posture and confronts hard truths. We search outside the traditional boundaries of public education to find pragmatic, equitable, and promising approaches to address the complex challenges facing public education. Our goal is to create new possibilities for the parents, educators, and public officials who strive to improve America's schools.

CRPE is a self-sustaining organization affiliated with the University of Washington. Our work is funded through private philanthropic dollars, federal grants, and contracts.



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Executive Summary

As charter schools become an increasingly significant force in American education, critics continue to question how well they serve our nation's most vulnerable students. Nationwide, students with individualized education programs (IEPs) account for approximately 8 percent of students enrolled in public charter schools, compared to 11 percent in traditional public schools. A 2012 report produced by the Government Accountability Office (GAO) found that special education enrollment gaps exist in almost every state, although charter schools sometimes serve more students with special needs than their district counterparts.¹

The GAO study did not document reasons for these gaps. Many people have hypothesized that students with special needs leave charter schools because they are “counseled out” or don’t receive the services they require. A 2013 report from the Center on Reinventing Public Education (CRPE) and Manhattan Institute found that this is not the case, at least in New York City.² The CRPE report found that the causes for the gap in New York City were complex and had little to do with these students leaving charter schools.

Instead, the report found that students with special needs, particularly in some disability categories, were far less likely than students with typical needs to enroll in charter schools to begin with. In addition, the report found that New York City charter schools were less likely to identify students as having special needs, and more likely to move students who came from special education programs in traditional public schools off IEPs and into general education programs.

Now we attempt to explain why a similar disparity in special education enrollment rates exists in Denver. Using data on all students in grades K–8 attending charter and traditional public schools in Denver between 2008–2009 and 2013–2014, we assessed the influence of various factors that could contribute to the special education gap, and how categories of students differ in their choices to

enter and leave schools. We also used data from Denver’s recently implemented SchoolChoice enrollment system to understand how student preferences affect the gap.

Taken together, these data show that a gap between charter and traditional public schools does exist in Denver and, like in New York City, that gap has little to do with students with special needs leaving charter schools. Instead, the gap is primarily caused by students’ preferences for different types of schools, how those schools choose to classify and educate students with differing needs, and the mobility of students without disabilities between charter and traditional public schools.

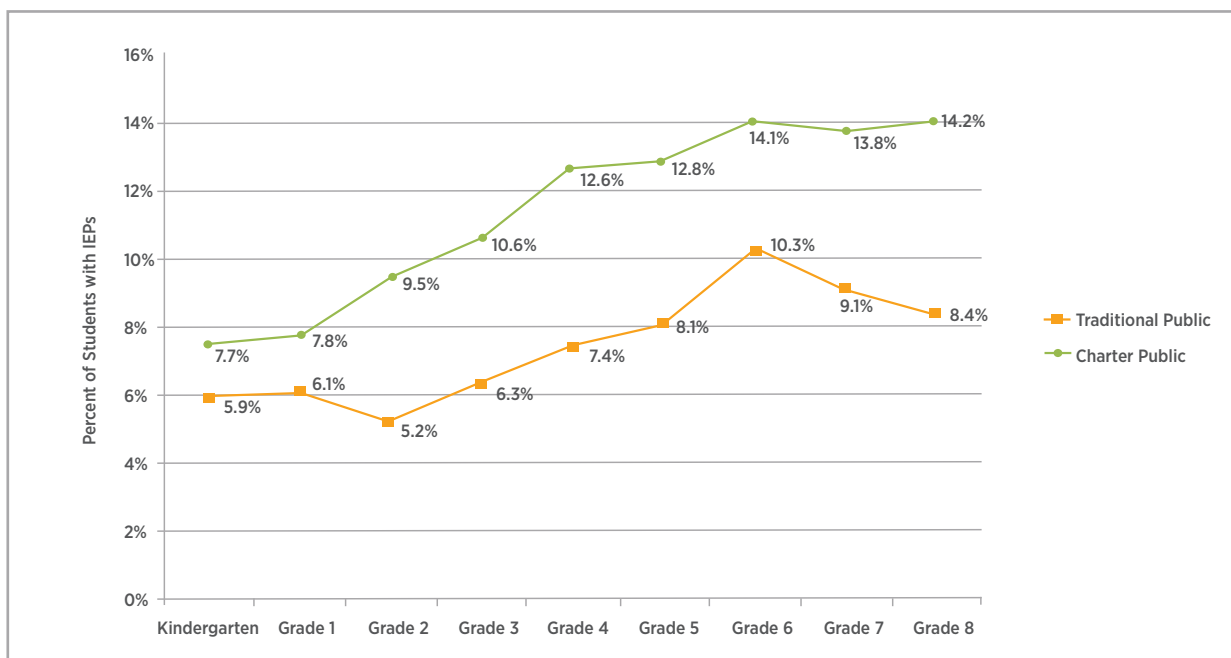
Specifically, this analysis reveals several important findings about the special education gap in Denver:

- **The special education gap between charter and traditional public schools begins before kindergarten and continues to increase through eighth grade.** Figure ES1 looks at a snapshot of all grades in the fall of 2012 to demonstrate how the gap between traditional and charter school special education enrollment changes from grade to grade. At kindergarten entry, the gap is roughly 2 percentage points, widening to roughly 4 percentage points at the start of middle school. The gap increases throughout the middle school grades, primarily due to a drop in the percentage of charter middle school students with IEPs. In eighth grade, the gap is more than triple what it was in kindergarten.
- **The gap begins because students with special needs are less likely to apply to charter schools in kindergarten and sixth grade, the gateway grades when students often enter new schools.** In fact, these differences in who applies explain the vast majority of the special education gap in the middle school grades, particularly for students with certain categories of disability, such as intellectual disabilities, serious emotional disabilities, specific learning disabilities, physical disabilities, and multiple disabilities.

1. US Government Accountability Office, *Charter Schools: Additional Federal Attention Needed to Help Protect Access for Students with Disabilities* (Washington, DC: GAO, 2012).

2. Marcus A. Winters, *Why the Gap? Special Education and New York City Charter Schools* (Seattle, WA: Center on Reinventing Public Education and the Manhattan Institute for Policy Research, 2013).

Figure ES1 The Special Education Gap, by Grade, 2012



*Note: the difference in IEP rates between traditional and public charter schools is significant at the $p < .01$ level or less beginning in grade 2.

- **The gap grows significantly between kindergarten and fifth grade.** For a student who entered kindergarten in 2008, the gap more than quadruples by the time they enter fifth grade. This occurs partly because charter schools are less likely to classify students as needing special education services, and partly as a result of students without IEPs changing schools.

Figure ES2 shows how different factors contribute to the special education gap in elementary school. A gap of 1.7 percentage points exists in kindergarten. As students progress through grades, that gap widens, primarily due to changes in student classifications—mostly a higher probability of new classifications in traditional public schools—and student mobility.

Nearly half (46 percent) of the growth in the gap between kindergarten and fifth grade occurs because charter schools are less likely to classify students as in need of special education services, and more likely to declassify them, than are traditional public schools. In particular, traditional public schools are significantly more likely than charter schools to classify a student as having a specific learning disability.

Slightly more than half (54 percent) of the growth in the gap over those same grades results from the number of general education students in charter schools going up as new students enroll, and not from the number of students with special needs going down. Because lottery data only go back two years, it is not yet possible to know whether the differences in classifications are due to the type of student who attends a charter school or due to different experiences across sectors.

Figure ES2 Changes in the Special Education Gap in Elementary School Are Due to IEP Classification Changes and Student Mobility

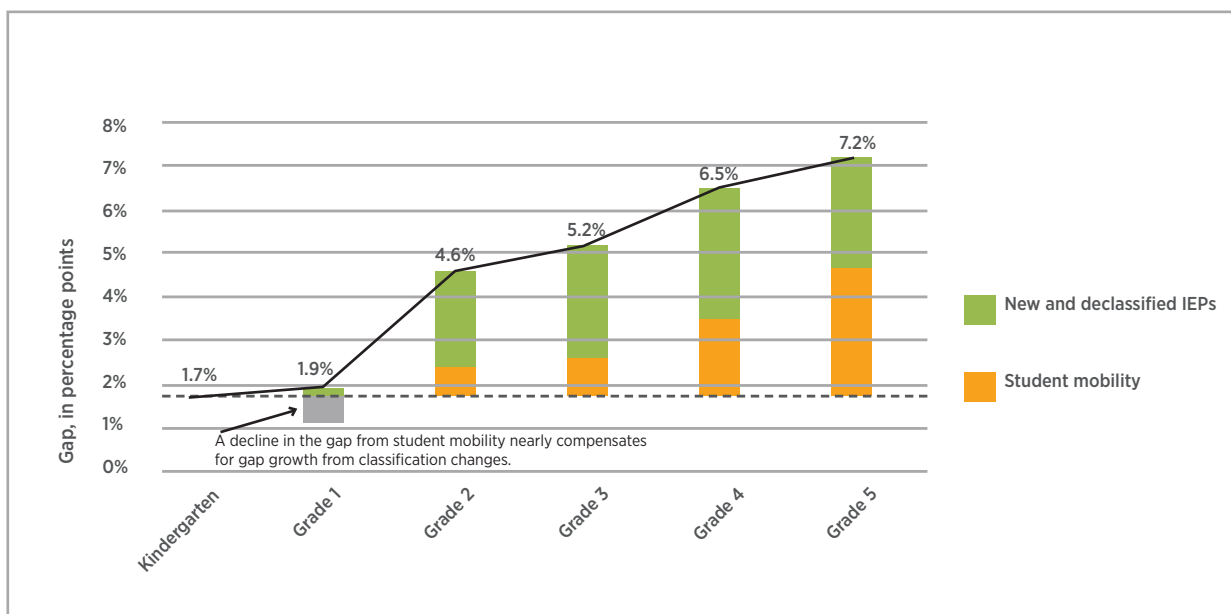
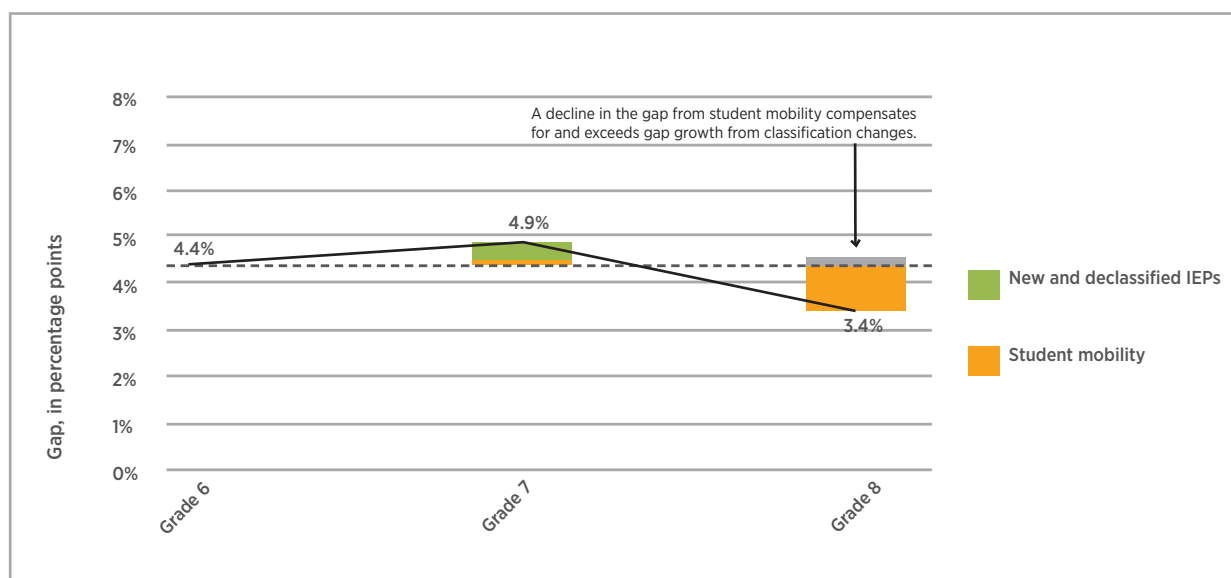


Figure ES3 Changes in the Special Education Gap in Middle School Are Due to IEP Classification Changes and Student Mobility



- **The gap grows and then declines in middle school.** As Figure ES3 shows, as a cohort of students moves from sixth to seventh grade the gap grows slightly, primarily due to students having their IEPs

declassified. The gap then decreases notably as students move from seventh to eighth grade, primarily due to student mobility, specifically as students without IEPs enroll.

- **Students with IEPs in traditional public schools change schools more often than students with IEPs in charter public schools.** In Denver, students with IEPs are less likely to leave their school when they are enrolled in a charter school. Five years after enrolling in kindergarten, about 65 percent of charter school students with IEPs are still in their original schools, while about half of students in both sectors without IEPs are still in their original schools, and only 37 percent of traditional public school students with IEPs are still in their original schools. Consequently, the mobility of students with IEPs actually reduces the special education gap across sectors. This finding counters the conventional wisdom that students with IEPs are more likely to leave, or be counseled out, of charter schools.

Denver students with IEPs are indeed less likely to attend charter schools than traditional public schools, but the factors producing that gap are complex and run counter to conventional wisdom.

The fact that students with identified disabilities are much less likely to apply to charter schools (particularly in middle school) is an important finding that deserves attention, both from researchers and from school operators. Some preliminary evidence from CRPE's interviews in Denver suggests that parents whose students have IEPs may not understand that students with special needs have as much right as any other student to enroll in charter schools, which are then required to provide services.

The finding that charter schools are less likely to identify a child as needing special education services, and more likely to declassify them, opens up an important area for future research. CRPE's analysis in New York City demonstrated that the difference was explained by factors related to charter schooling itself (such as intervention strategies), not to student differences. In future years, we will be able to assess whether that is the case in Denver as well.

In the meantime, the fact that students with IEPs leaving charter schools is not a significant factor in the special education gap at either the elementary or middle school level has important implications: efforts to address the gap by focusing on the counseling out of students with special needs are unlikely to be productive.

For middle school, the results suggest that the most productive avenue for addressing the special education gap is to encourage more students with special needs to apply to charter schools. Denver Public Schools and the

Denver charter sector should make sure parents know that charter schools can, and must, serve students with special needs. Denver Public Schools has taken recent steps to create specialized programs for students with moderate to severe disabilities in high-performing charter schools. These programs, combined with more active recruitment and placement efforts, will likely help.

In elementary schools, the growth of the gap is largely explained by the identification rate in traditional public schools relative to charter schools. This gap is not worrisome if those students are being served just as well without a special needs identification. In fact, it may be desirable. If future analysis shows that effective charter school interventions explain a significant portion of the difference, policy efforts meant to simply increase the percentage of students with IEPs in charter schools could lead to unnecessary classifications.

Finally, while the results in Denver are consistent with our previous analysis in New York City, charter schools in these two cities have been found by prior empirical research to be relatively effective at improving student achievement. This is not the case for charter schools in all other cities. Further research on the causes of the special education gap in other cities with effective charter sectors, as well as in those where results are less promising, is warranted to determine if these factors are in fact common nationwide.

Introduction

Charter schools have expanded rapidly across the nation and throughout Colorado over the last decade. Today, about 16 percent of Denver's public school students in kindergarten through 12th grade attend one of the city's 45 charter schools.³ Although Denver's charter schools have not yet been subjected to a "gold-standard" randomized field trial, prior research using a sophisticated matching strategy has found that students who attend Denver charter schools perform better on average than they would if they had attended a nearby traditional public school instead.⁴

Nonetheless, many worry that the charter sector fails to achieve the mission of educating all students. In particular, a frequent critique of charter schools in Colorado and nationwide is that they fail to enroll a similar proportion of students with disabilities to that of the surrounding traditional public schools.

Since charter schools are public schools, they are required to offer a free and appropriate public education (FAPE) to students with disabilities. Nonetheless, it is common for charter schools to have substantially smaller special education enrollments than traditional public schools do. For instance, a recent report by the Government Accountability Office (GAO) found wide gaps between the percentages of students enrolled in special education in charter and surrounding traditional public schools nationwide.⁵ Lawmakers have sought policies to close this special education gap. For instance, in 2010 the New York state legislature adopted a policy requiring charter school authorizers to set enrollment and attendance targets for students with disabilities and to take a charter school's efforts to meet such targets into account when considering renewing that school's charter.

Charter school critics point to numerous anecdotes from parents claiming that a charter school inappropriately encouraged their child with special needs to leave the

school. This phenomenon is commonly referred to as "counseling out." Though it provided no direct evidence, the GAO report suggested that counseling out might play a substantial role in explaining the special education gap.

So far, very little empirical research has considered the underlying causes of charter school special education gaps across the nation. This omission in the research is important because adopting sound policies to address the special education gap requires not only documenting its existence, but also understanding its underlying causes.

In a recent paper, I used student-level data to map the movement of students across the charter and traditional public school sectors in New York City.⁶ I found that the special education gap in New York City is not primarily driven by the attrition of students with special needs from charter schools. In fact, students with disabilities who started kindergarten in a charter school were more likely to be enrolled in that same charter school four years later than students with disabilities who started in a traditional public school were to be enrolled in that public school four years later.⁷ Rather, the evidence suggested that the largest driver of the special education gap in New York City elementary schools was the type of student who chooses to apply to the charter school sector. Further, the gap in New York City grows considerably as students progress through elementary grades, primarily because students in charter schools are less likely to be newly classified into special education and more likely to have their Individual Education Programs (IEPs) declassified (i.e., to exit special education services into a general education program).

In this paper, I use a student-level dataset similar to that in New York to map student movement and special education classifications in Denver charter and traditional public elementary and middle schools. The dataset includes the universe of students attending charter or


3. Author calculations using dataset supplied by Denver Public Schools.

4. CREDO, *Multiple Choice: Charter School Performance in 16 States* (Stanford: Center for Research on Education Outcomes, Stanford University, 2009); CREDO, *National Charter School Study 2013* (Stanford: Center for Research on Education Outcomes, Stanford University, 2013).

5. US Government Accountability Office, *Charter Schools: Additional Federal Attention Needed to Help Protect Access for Students with Disabilities*.

6. Winters, *Why the Gap? Special Education and New York City Charter Schools*.

7. This finding was contradicted by a recent report by the Independent Budget Office in New York City, which found much higher attrition among kindergartners with special needs who attended charter schools than among those who attended nearby traditional public schools. However, the findings of that study are severely flawed because the analysis inappropriately excluded students with disabilities who received any instruction in a general education classroom setting. See New York City Independent Budget Office, *Staying or Going? Comparing Student Attrition Rates at Charter Schools with Nearby Traditional Public Schools* (New York City: New York City Independent Budget Office, 2014).



traditional public schools in Denver from 2008–2009 through 2013–2014. In addition, beginning with the class of 2012–2013, the dataset includes information on student applications to attend charter and traditional public schools according to the city’s open enrollment plan. These data allow me to quantify the effect of student preferences on the special education gap, and also to map the factors that produce changes in the gap as students progress through school over time.

I find no evidence that the special education gap is primarily driven by the movement of students with disabilities out of charter schools. In fact, a significantly smaller percentage of students in special education who enter a charter school in kindergarten exit that school during elementary grades, compared to students with special needs who enroll in a traditional public school in kindergarten. These results are consistent with the prior findings from New York City.

The special education gap in Denver begins because students with disabilities are less likely than students without disabilities to apply to charter schools in gateway grades. Differences in the type of student who applies explain the vast majority of the special education gap in middle school grades.

However, the special education gap in Denver elementary schools more than doubles as students progress between kindergarten and fifth grade. About half of the growth in the gap in elementary grades (46 percent) occurs because of classification differences across sectors. In particular, students who attend traditional public schools are more likely to be newly classified into special education during these years than are students in charter schools. Unfortunately, because information on enrollment lotteries is available only for the past two years, at this time it is not possible to know whether the differences in classifications are due to the type of students who attend charter schools or to different schooling experiences across sectors. This is a clear avenue for future research.

The remaining 54 percent of the growth in the special education gap in elementary grades is due to differences in student mobility across sectors. However, the gap does not primarily grow due to the movement of students with disabilities across sectors and out of the city’s school system—in fact, the gap tends to shrink due to this factor. Rather, the impact of student mobility on growth of the gap is driven primarily by general education students who are more likely to enter into charter schools, and thus disproportionately reduce the percentage of students with disabilities within the charter sector.

The results in this paper suggest that the factors

producing the charter school special education gap are complicated. Anecdotal evidence strongly suggests that at least some students with disabilities have been inappropriately counseled out of charter schools. However, the enrollment numbers make clear that movement of students with disabilities out of the charter school sector is not a large factor explaining the special education gap. Thus, a policy response targeted toward eliminating the counseling out of students with disabilities is unlikely to yield meaningful results.

STUDENT-LEVEL DATA FROM DENVER PUBLIC SCHOOLS

The analyses described in this paper were carried out using student-level data made available by the Denver Public School system. The dataset includes information on the universe of students attending Denver charter and traditional public schools from 2008–2009 through 2013–2014. A unique student identifier follows individual students as they progress through school over time.

The dataset includes an identifier for whether a student has been assigned an IEP; an IEP categorizes that student into special education. The dataset also includes a separate variable listing that student’s particular disability. Information about whether the student has an IEP is collected as of October 1 of a particular school year. Information on the type of disability is reported as of December 1.

For school year 2012–2013, the dataset includes information about student preferences for schools according to the city’s school choice policy. Each year, students are offered the opportunity to state a preference for up to five schools—including charter and traditional public schools. In March, the district then assigns students to schools based on a matching algorithm that takes into account school preferences for certain student types—for instance, siblings of current students or students who live within a specific boundary area—and students’ school preference ratings. When there are more students within a school preference category who state a preference for a school than there are remaining seats within that school, students are assigned randomly. Students who are not placed into their first preference school are put on a randomly generated waiting list for their preferred schools and might be placed into their higher-preferenced school if an opening becomes available before the school year begins.

For each student, the dataset includes the school preferences stated by the student as well as the order of preference. The data list the preferences provided by the student for the first round of matching in March. The

data also include a variable that identifies the school to which the student was assigned through the original matching process. Sometimes, students may attend a different school than they were originally matched to, for instance, if a spot in a more highly preferred school became available in the summer. The dataset allows me to observe the school that the student actually attended in each school year.

I focus the analysis on elementary and middle schools and thus restrict the dataset to include students in kindergarten through eighth grade. I exclude high schools primarily because the higher attrition rates out of the Denver school system among high school students in both sectors tend to complicate interpretation of the analyses.

My analyses follow cohorts of students as they enter and progress through a school level (i.e., elementary or middle school). To account for student grade repetition, which is more common in charter schools than in traditional public schools, I follow students as they

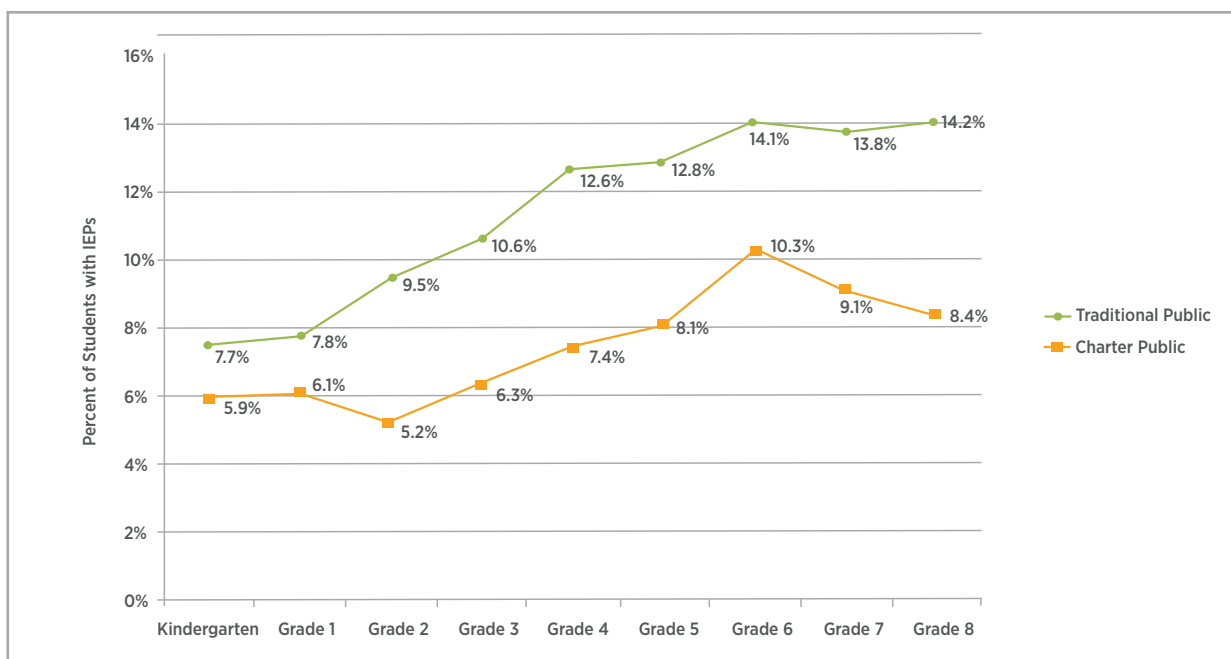
progress through years rather than grades.

I focus the analysis on the most recent entering cohort of students that the data allow me to follow for the typical time period that it would most often take to finish the school level: six years in elementary school (commonly grades K–5) and three years in middle school (commonly grades 6–8).⁸ Thus, the elementary school analysis focuses on students enrolled in kindergarten in 2008–2009 and follows them through 2013–2014, when most students are in fifth grade, while the middle school analysis includes the cohort of students who entered sixth grade in 2011–2012 and follows them through 2013–2014, when most students are in eighth grade.

Analyses and Results

In what follows I provide a variety of analyses intended to address specific factors that could contribute to the differences in the percentage of students with disabilities enrolled in charter and traditional public schools. I address each of these issues separately.

Figure 1 The Special Education Gap, by Grade, 2012



Note: The difference in IEP rates between charter and traditional public schools is significant at the $p < 0.01$ level or less beginning in Grade 2.

8. Unlike in some other districts, most charter schools in Denver use a relatively conventional grade-span configuration. Among the eight charter schools that started in either pre-kindergarten or kindergarten in 2008 (the primary cohort year used here for elementary analyses), one ended in sixth grade, five ended in eighth grade, and two ended in 12th grade. In 2011, the primary cohort year used here to evaluate middle school grades, only two charter schools started in fifth grade, while nine started in sixth grade.

DENVER PUBLIC SCHOOLS: THE SPECIAL EDUCATION GAP BY GRADE

Because the percentage of students in a particular grade within the charter and traditional public school sectors are not equal, aggregate comparisons of the percentages of special education students in the charter and traditional public school sectors can be highly misleading. It is thus most informative to consider the gap by grade level. Figure 1 illustrates the special education gap by grade as of October 1, 2012, for all students enrolled in Denver public and charter schools on that date (not only the students included in the longitudinal analyses that follow).

As of kindergarten, there is a gap of about 1.8 percentage points in the percentage of students in charter and

traditional public schools who have an IEP. This difference is statistically significant at the 10 percent level. This gap more than doubles as students progress through the elementary grades, reaching 4.7 percentage points by fifth grade. The gap then continues to grow in the middle school grades as well, reaching 5.8 percentage points by eighth grade.

Table 1 similarly describes the special education gap by grade in December 2012, but it disaggregates the analysis by the type of disability. Though there is a difference by sector in the overall percentage of students in kindergarten with an IEP, I find no significant differences at this time for any particular disability category. The growth in the special education gap

Table 1 The Special Education Gap by Grade and Disability Classification, 2012

	Kindergarten		Grade 1		Grade 2		Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8									
	TPS	C	TPS	C		TPS	C		TPS	C		TPS	C		TPS	C		TPS	C							
Intellectual Disability	0.0%	0.1%	0.3%	0.1%		0.2%	0.3%		0.4%	0.0%	*	0.5%	0.2%		0.8%	0.1%	***	0.9%	0.1%	***	0.8%	0.2%	**			
Serious Emotional Disability	0.0%	0.1%	0.3%	0.1%		0.5%	0.1%		0.5%	0.3%		0.7%	0.3%		0.9%	0.8%		1.1%	0.3%	***	1.2%	0.1%	***			
Specific Learning Disability	0.6%	0.4%	1.6%	1.3%		3.1%	2.3%		5.5%	2.8%	***	7.1%	5.3%	*	8.2%	5.3%	**	9.2%	7.5%	**	8.2%	5.9%	***	8.5%	6.7%	**
Hearing Impairment	0.3%	0.1%	0.2%	0.1%		0.2%	0.0%		0.1%	0.2%		0.3%	0.2%		0.2%	0.2%		0.2%	0.1%		0.3%	0.1%		0.3%	0.2%	
Visual Impairment	0.0%	0.0%	0.0%	0.0%		0.1%	0.0%		0.0%	0.0%		0.1%	0.0%		0.0%	0.0%		0.1%	0.0%		0.0%	0.1%		0.1%	0.0%	
Physical Disability	0.4%	0.2%	0.7%	0.1%	*	1.0%	0.0%	***	1.1%	0.2%	**	1.4%	0.0%	***	1.0%	0.8%		1.7%	0.9%	**	1.6%	1.6%		1.5%	1.1%	
Speech/ Language Impairment	3.7%	2.8%	4.1%	4.1%		3.6%	2.4%		2.2%	2.2%		1.5%	1.0%		1.1%	1.0%		0.7%	0.5%		0.6%	0.6%		0.6%	0.2%	*
Multiple Disabilities	0.1%	0.0%	0.3%	0.1%		0.3%	0.1%		0.5%	0.0%	*	0.6%	0.0%	*	0.4%	0.0%		0.5%	0.0%	***	0.6%	0.0%	***	0.5%	0.0%	**
Autism Spectrum Disorders	0.3%	0.1%	0.5%	0.5%		0.5%	0.1%		0.5%	0.5%		0.5%	0.5%		0.5%	0.2%		0.3%	0.1%		0.5%	0.2%		0.4%	0.3%	
Traumatic Brain Injury	0.0%	0.0%	0.0%	0.1%		0.0%	0.0%		0.1%	0.0%		0.1%	0.2%		0.1%	0.2%		0.0%	0.0%		0.1%	0.1%		0.1%	0.0%	

* $p < .10$, ** $p < .5$, *** $p < .01$

Note: TPS = traditional public schools. C = charter schools.

Note: Percentages for deaf-blindness, orthopedic impairment, and infant/toddler with a disability were zero for both categories across all grades. For preschoolers with a disability, the percentages in kindergarten were 2.3 in traditional public schools and 2.2 for charter public schools. For all other grades the values were zero.

through the middle school grades appears to derive primarily from a disproportionate increase in the percentage of students with a specific learning disability in traditional public schools relative to charter schools. This gap in specific learning disabilities is maintained through the middle school grades.

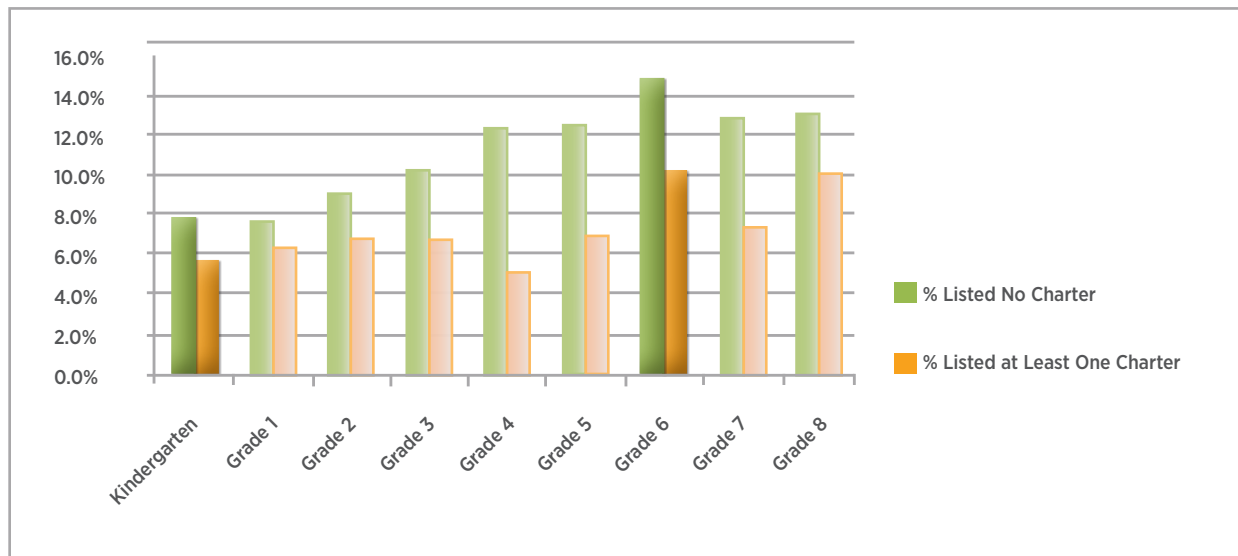
CHARTER SCHOOL APPLICATIONS BY STUDENTS WITH IEPs

Figure 2 reports the percentage of students with IEPs who listed at least one charter school as one of their five school preferences in March 2012.⁹ The figure highlights the results from kindergarten and sixth grade because these are gateway grades in which the majority of students are expected to move schools. Thus, these are the grades for which students are most likely to state a school preference. For instance, 68 percent of entering kindergarten students that year stated at least one preference, compared to only 5.7 percent of second-grade students.

Figure 2 shows that in the gateway grades, students with IEPs are significantly less likely to list at least one charter school as a preference. In kindergarten, 5.6 percent of students who listed at least one charter school as one of their five preferences had an IEP by October 1, while 7.8 percent of students who did not list a preference for a charter school had an IEP. These numbers are similar to those for actual percentages of students with IEPs enrolled in charter and traditional public schools in October 2012.

There is also a statistically significant and substantial difference in sixth grade in the percentage of students with IEPs listing a charter school as a preference. The gap in the special education rates of those who stated a preference for a charter and those who did not is about 4.6 percentage points.

Figure 2 Percentage of All Students Who Had an IEP and Listed a Charter School as a Preference, in Each Grade Entry



Note: Darker shades indicate entry grades in which the majority of students expressed a preference.

Note: Differences for kindergarten, 4th grade, 6th grade, and 7th grade are significant at $P < 0.01$. Differences for 5th grade are significant at $p < 0.5$. Differences for all other grades are not significant.

9. Though not reported for space considerations, results are similar when broken out by the rank of the preference for a school (i.e., the student's first, second, third preference, etc.).

Table 2 Percentage of Students Who Listed a Charter School as a Preference, by Disability Classification

	Kindergarten			Grade 1			Grade 2			Grade 3			Grade 4			Grade 5			Grade 6			Grade 7			Grade 8		
	NCP	CP		NCP	CP		NCP	CP		NCP	CP		NCP	CP		NCP	CP		NCP	CP		NCP	CP		NCP	CP	
Intellectual Disability	0.1%	0.0%		0.1%	0.0%		0.2%	0.0%		0.3%	0.0%		0.4%	0.0%		0.5%	0.0%		0.9%	0.0%	***	0.7%	0.0%		0.7%	0.5%	
Serious Emotional Disability	0.0%	0.1%		0.3%	0.5%		0.5%	0.0%		0.5%	0.0%		0.7%	0.0%		0.9%	0.0%		1.0%	0.5%	**	0.9%	0.4%		1.0%	1.0%	
Specific Learning Disability	0.6%	0.3%		1.6%	1.0%		3.0%	4.3%		5.2%	4.4%		7.0%	3.6%	*	8.0%	4.1%	*	9.5%	7.4%	***	7.7%	4.7%	*	8.2%	5.4%	
Hearing Impairment	0.3%	0.1%		0.2%	0.0%		0.2%	0.0%		0.1%	0.0%		0.2%	0.5%		0.2%	0.0%		0.2%	0.1%		0.2%	0.0%		0.2%	0.5%	
Visual Impairment	0.0%	0.0%		0.0%	0.0%		0.1%	0.0%		0.0%	0.0%		0.1%	0.0%		0.0%	0.0%		0.1%	0.1%		0.0%	0.0%		0.1%	0.0%	
Physical Disability	0.5%	0.0%	**	0.6%	0.5%		0.9%	0.0%		1.0%	2.2%		1.3%	0.5%		1.1%	0.0%		1.7%	1.0%	**	1.6%	1.6%		1.4%	0.5%	
Speech/ Language Impairment	3.7%	3.3%		4.1%	4.9%		3.5%	2.6%		2.2%	1.1%		1.5%	0.5%		1.1%	1.7%		0.6%	0.6%		0.6%	0.4%		0.5%	1.0%	
Multiple Disabilities	0.1%	0.0%		0.3%	0.0%		0.3%	0.0%		0.5%	0.0%		0.6%	0.0%		0.4%	0.0%		0.6%	0.0%	***	0.5%	0.0%		0.4%	0.0%	
Autism Spectrum Disorders	0.3%	0.2%		0.5%	0.0%		0.5%	0.0%		0.5%	0.0%		0.5%	0.0%		0.4%	0.0%		0.3%	0.2%		0.5%	0.0%		0.4%	0.0%	
Traumatic Brain Injury	0.0%	0.0%		0.0%	0.0%		0.0%	0.9%	***	0.1%	0.0%		0.0%	0.5%	***	0.1%	0.0%		0.0%	0.0%		0.1%	0.0%		0.1%	0.0%	

* $p < .10$, ** $p < .5$, *** $p < .01$

Note: NCP = no charter preference. CP = charter preference.

Note: Percentages for deaf-blindness, orthopedic impairment, and infant/toddler with a disability were zero for both categories across all grades. For preschoolers with a disability, the percentages in kindergarten were 2.4% for no charter preference listed, and 1.7% for charter preference listed. For all other grades the values were zero.

Table 2 describes student preferences for public schools broken out by type of disability. In kindergarten, I again find no significant difference in preference rates for students with any particular disability.

For sixth-grade students, however, students in several particular disability classifications are less likely to apply to charter schools. Significant differences are found for the percentage of sixth-grade students listing a charter school preference who are classified as having an intellectual disability, serious emotional disability, specific learning disability, physical disability, or multiple disabilities. However, though significant, the magnitude of the difference for many of these classification categories is relatively small. Again, the category with the largest difference, which accounts for nearly half of the overall difference, is specific learning disability: 9.5 percent of students who did not list a charter school preference are

classified as having a specific learning disability, compared to 7.4 percent of students who did state a preference for a charter school.

These results suggest that a significant driver of the special education gap is that students with disabilities are less likely to apply to charter schools than are students without disabilities. The causes of this difference could come from a variety of avenues. Perhaps students with disabilities prefer the services that are offered in traditional public schools in gateway grades. It is also possible that charter schools discourage students with disabilities from applying, or at least do not encourage them to apply in the same way that they encourage students without disabilities. The current paper is not in a position to explore this issue further.

CHARTER SCHOOL EXITS BY STUDENTS WITH IEPs

I now consider the extent to which students with disabilities leave charter schools in which they were previously enrolled. For this analysis, I restrict the dataset to include only those students who were enrolled in kindergarten in 2008–2009 or in sixth grade in 2011–2012. I can then describe the percentage of students who exit their original elementary or middle school after a given number of years. Students are classified as exiting their school if they are observed to be enrolled at another time in another Denver charter or traditional public school, or if they exit the dataset, which would occur if they were to exit the Denver school system altogether.

Figures 3 and 4 compare the exiting behavior of students who were enrolled in a charter school in kindergarten in 2008–2009 or sixth grade in 2011–2012 to that of students who were enrolled in a traditional public school for those respective grades in that same cohort. The colored lines represent the exits of all students, with each color representing a different category of students: traditional public school students with IEPs, traditional public school students without IEPs, charter school students with IEPs, and charter school students without IEPs. The horizontal axis looks at student exiting for each year of schooling.

That is, Year 2 shows the percentage of students who remained in their initial school by October of the following year, while Year 3 reports the percentage of students who remained in their initial school by October two years following their initial year. T-tests are used for inference.

The results in Figure 3 consider the exiting behavior of students who were enrolled in kindergarten in 2008–2009. The results show no significant difference in the exiting percentages when considering all students in charter and traditional public schools. I also find no significant difference between sectors in the exiting behavior of students who do not have an IEP, except that students without an IEP are significantly more likely to exit a charter school after their initial year than a traditional public school.

However, the results demonstrate that among those students with an IEP in kindergarten, significantly *fewer* students exited their original charter school than exited their original traditional public school. By October 1 of Year 6 (2013–2014), when most students were enrolled in fifth grade, 63 percent of students who had an IEP in kindergarten and began in a traditional public school had exited that school, compared to 35 percent of students with an IEP who began in a charter school.

Figure 3 Percentage of Students in Elementary Cohort Still in Their School After Year 1

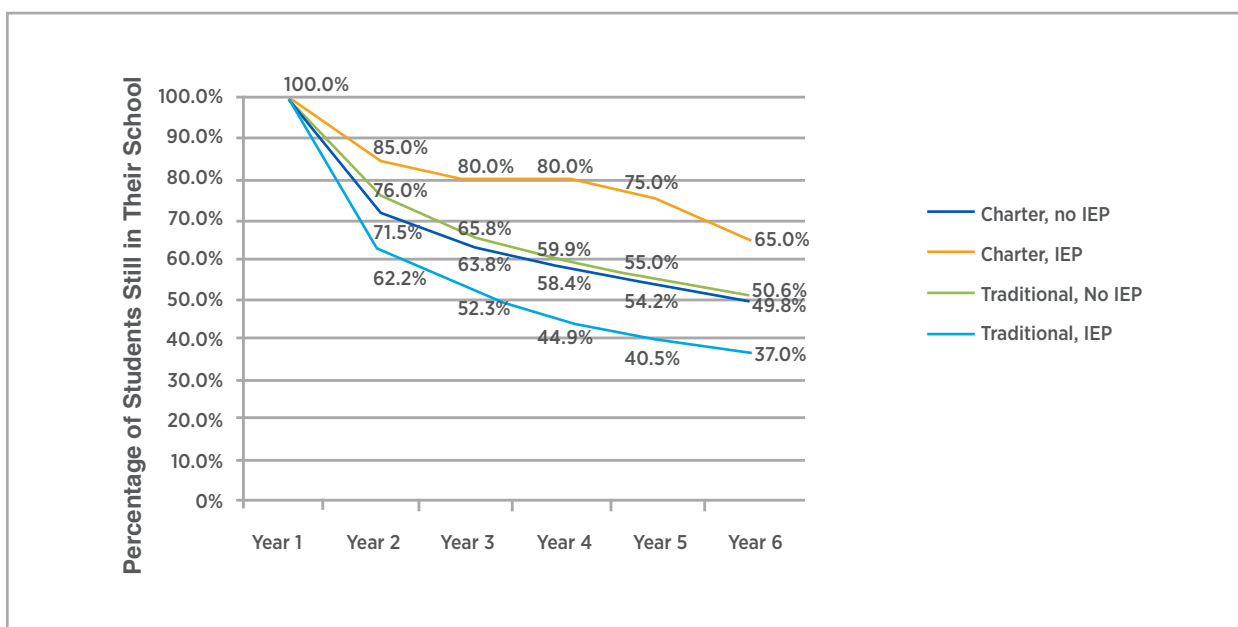


Figure 4 reports results for students who began the sixth grade in 2011–2012. In the middle school grades, the results show that among all students and among students without an IEP, attrition in charter schools is significantly lower than attrition in traditional public schools. However, I find no significant difference in the exit rates of students who had an IEP in the sixth grade.

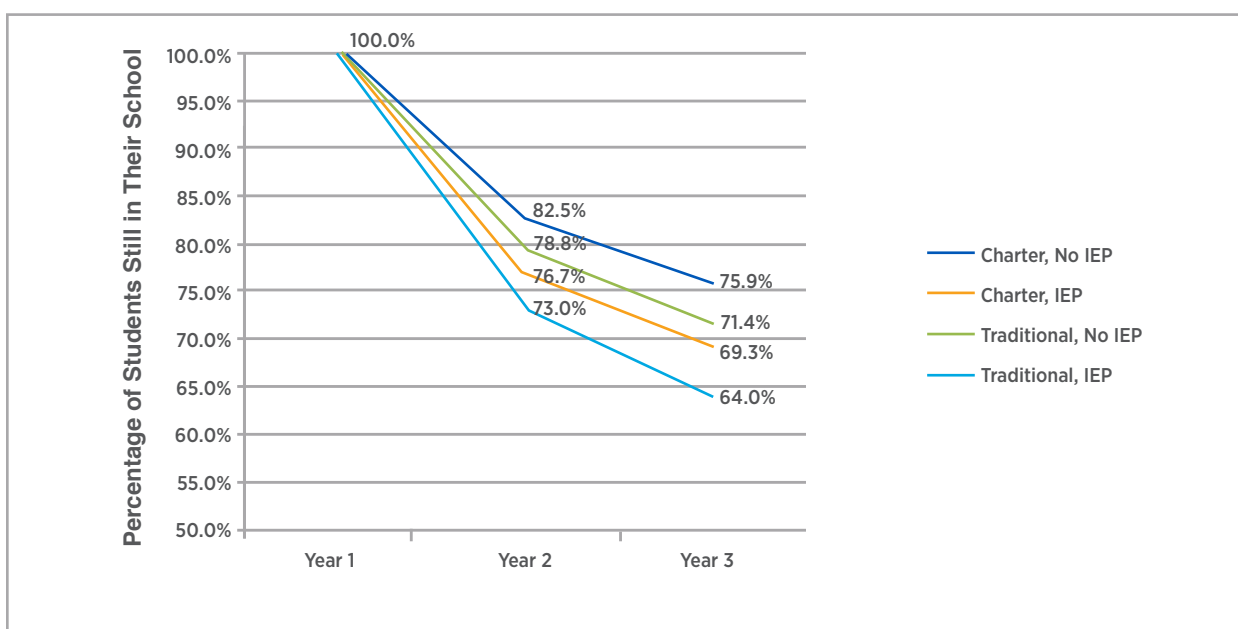
The results of the analysis of student exiting behavior counters conventional wisdom about charter schools and the special education gap. I followed all students who entered charter schools in a kindergarten cohort and found that the attrition of students with disabilities out of charter schools is significantly smaller than the

attrition found in traditional public schools, while I found no difference by sector in the exiting behavior of middle school students with disabilities.

DECONSTRUCTING THE GROWTH OF THE SPECIAL EDUCATION GAP IN DENVER

The special education gap in Denver is partly determined—and in middle schools, particularly determined—by a lower probability that students with disabilities will apply to attend a charter school. However, particularly in elementary grades, the growth in the special education gap over time as students progress through non-gateway grades is considerable.

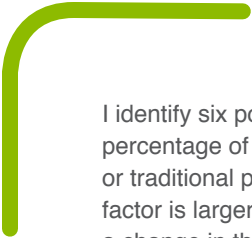
Figure 4 Percentage of Students in Middle School Cohort Still in Their School After Year 1



The following exercise seeks to deconstruct the underlying causes for the growth in the special education gap as students progress through school. I follow a cohort of students over time as they progress through the school system and map how student mobility and changes in IEP classifications contribute to the growth in the special education gap each year.

As was the case for the prior analyses, to evaluate elementary grades, I focus on the cohort of students who were enrolled in kindergarten in 2008–2009, and when evaluating middle school grades, I identify students who were in sixth grade in 2011–2012. I include all students who began in these cohorts and track their movements and classifications within the system over time.¹⁰

10. The analysis does not include students who entered this cohort for the first time in later years. These students are excluded from the analysis because I lack information on when they began kindergarten—for instance, they might have been retained at some point—and thus cannot accurately identify that they belong in a given entry cohort.



I identify six potential factors that could influence the percentage of students with an IEP within the charter or traditional public school sectors. When the effect of a factor is larger in one sector than the other, it will lead to a change in the special education gap. The six factors can be classified into two major categories: *classification changes* and *student mobility*. The definitions of these factors are nearly identical to those used in my prior evaluation of this issue in New York City.¹¹

CHANGES IN IEP CLASSIFICATIONS

New IEP

Student without an IEP the previous year is newly classified as having a disability. This factor would increase the special education gap if students in traditional public schools are more likely to receive a new IEP than are students in charter schools.

Declassified IEP

Student with an IEP in the previous year is classified as no longer having an IEP. This factor would increase the special education gap if students in charter schools are more likely to have their IEP declassified than are students in traditional public schools.

MOBILITY AMONG PUBLIC SCHOOL STUDENTS

General Education Student Exits from a Sector

Occurs when a student without an IEP attends a traditional public school the prior year and then leaves that sector to attend a charter school, or vice versa. Also occurs when a general education student in either sector exits the Denver school system entirely. The exiting of such students decreases the total number of students in the sector without influencing the number of students with IEPs in the sector. For instance, as general education students exit the charter school sector, the percentage of charter school students with IEPs increases, which would tend to decrease the special education gap.

Student with IEP Exits from a Sector

Occurs when a student with an IEP attends a traditional public school the prior year and then leaves that sector to attend a charter school, or vice versa. Also occurs when a student with a disability in either sector exits the Denver school system entirely. Thus, a student with an IEP exiting a charter school would decrease the percentage of charter school students with an IEP, which would tend to increase the special education gap.

General Education Student Enters a New Sector

Occurs when a student without an IEP attends a traditional public school the prior year and then enters a charter school, or vice versa. This also occurs if a general education student who was originally observed in the selected cohort but had exited the Denver school system in a prior year returns to the system. The entrance of these students into a new sector increases the total number of students in the sector without changing the total number of students with IEPs in the sector. Thus, as general education students enter the charter sector, the percentage of charter school students with IEPs decreases, which would tend to increase the special education gap.

Student with IEP Enters a New Sector

Occurs when a student with an IEP attends a traditional public school the prior year and then enters a charter school, or vice versa. This also occurs if a student with an IEP who was originally observed in the selected cohort but had exited the Denver school system in a prior year returns to the system. The entrance of these students into a new sector increases the total number of students in the sector as well as the number of students in the sector with an IEP. Thus, as students with IEPs enter the charter sector, the percentage of students with IEPs increases, which would tend to decrease the special education gap.

For each year after initial enrollment in either kindergarten or sixth grade, I map student classifications and movements within and out of the Denver school system. I use a formula to quantify the influence of each factor on the change in the percentage of students within a sector who have an IEP. That is, the data allow me to quantify by how many percentage points the percentage of students with IEPs in charter schools increased between 2008–2009 and 2009–2010. For example, how much can be attributed exclusively to students in the sector being newly classified into special education, how much can be attributed exclusively to students with IEPs changing sectors, and so on. Finally, I can assess the effect of each factor on the special education gap each year by taking the difference of the effect of that factor on the percentage of students with IEPs in traditional public schools and the factor's influence on the percentage of students with IEPs in charter schools.

11. The New York City analysis differs because it did not specifically account for students who exited the system altogether. The reported analysis in that paper only included students who were observed in the New York City system for each of the four years included in the analysis.

Table 3 Deconstructing the Factors Around Growth of the Special Education Gap in Elementary School Grades

	2009			2010			2011			2012			2013		
	C	TPS	Change in Gap	C	TPS	Change in Gap	C	TPS	Change in Gap	C	TPS	Change in Gap	C	TPS	Change in Gap
New IEP	1.3%	1.8%	0.5%	0.8%	1.8%	1.1%	1.9%	2.5%	0.6%	2.1%	2.6%	0.5%	1.7%	1.7%	0.0%
Declassified IEP	-1.3%	-1.0%	0.3%	-1.0%	-0.7%	0.3%	-0.5%	-0.7%	-0.2%	-0.7%	-0.8%	-0.1%	-0.2%	-0.6%	-0.4%
IEP Exit Sector, Exit Denver Data	-0.3%	-0.7%	-0.5%	-1.2%	-0.6%	0.6%	-0.8%	-0.7%	0.1%	-1.1%	-0.7%	0.4%	-0.9%	-0.6%	0.2%
IEP Enter Sector, Return to Denver Data	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.0%	0.3%	0.3%	0.2%	0.2%	0.0%	0.2%	0.3%	0.1%
IEP Exit Charter for Traditional	-0.5%	0.0%	0.5%	-0.7%	0.1%	0.8%	-0.5%	0.0%	0.5%	-0.4%	0.0%	0.5%	-1.1%	0.1%	1.2%
IEP Enter Charter from Traditional	1.0%	-0.1%	-1.1%	1.2%	-0.1%	-1.3%	1.0%	-0.1%	-1.1%	1.1%	-0.1%	-1.2%	2.1%	-0.3%	-2.4%
General Education Exit Sector, Exit Denver Data	1.0%	1.0%	-0.1%	0.7%	0.8%	0.0%	0.3%	0.7%	0.5%	0.3%	0.8%	0.5%	0.3%	0.8%	0.5%
General Education Enter Sector, Return to Denver Data	0.0%	0.0%	0.0%	-0.1%	-0.2%	-0.1%	-0.1%	-0.2%	-0.2%	-0.2%	-0.3%	-0.1%	-0.2%	-0.3%	-0.1%
General Education Exit Charter for Traditional	0.5%	0.0%	-0.5%	0.4%	0.0%	-0.4%	0.4%	-0.1%	-0.5%	0.3%	-0.1%	-0.3%	0.3%	-0.1%	-0.4%
General Education Enter Charter from Traditional	-0.9%	0.1%	1.0%	-1.3%	0.1%	1.4%	-0.4%	0.1%	0.4%	-1.0%	0.2%	1.2%	-1.6%	0.4%	2.0%

Note: TPS = traditional public schools. C = charter schools.

Note: The Charter and Traditional columns report the percentage point change from the prior year in the percentage of students with IEPs in the respective sector (charter schools, or traditional public schools) that is directly attributed to each specific factor. The Change in Gap column reports the difference between the growth in the percentage of students with IEPs in each sector that year. For example, between 2010 and 2011, the percentage of students with IEPs increased by 1.9 percentage points in the charter sector and by 2.5 percentage points in the traditional public school sector, due specifically to students in the respective sector receiving a new IEP. That factor alone increased the special education gap between traditional and charter schools by 0.6 percentage points (2.5 – 1.9) that year. Calculations in particular cells differ in some cases due to rounding. The raw numbers of students used for these calculations are reported in Appendix A.

Table 4 Deconstructing the Growth of the Special Education Gap in Middle School Grades

	2012			2013		
	Charter Schools	Traditional Public Schools	Change in Gap	Charter Schools	Traditional Public Schools	Change in Gap
New IEP	2.1%	2.6%	0.5%	1.7%	1.7%	0.0%
Declassified IEP	-0.7%	-0.8%	-0.1%	-0.2%	-0.6%	-0.4%
IEP Exit Sector, Exit Denver Data	-1.1%	-0.7%	0.4%	-0.9%	-0.6%	0.2%
IEP Enter Sector, Return to Denver Data	0.2%	0.2%	0.0%	0.2%	0.3%	0.1%
IEP Exit Charter for Traditional	-0.4%	0.0%	0.5%	-1.1%	0.1%	1.2%
IEP Enter Charter from Traditional	1.1%	-0.1%	-1.2%	2.1%	-0.3%	-2.4%
General Education Exit Sector, Exit Denver Data	0.3%	0.8%	0.5%	0.3%	0.8%	0.5%
General Education Enter Sector, Return to Denver Data	-0.2%	-0.3%	-0.1%	-0.2%	-0.3%	-0.1%
General Education Exit Charter for Traditional	0.3%	-0.1%	-0.3%	0.3%	-0.1%	-0.4%
General Education Enter Charter from Traditional	-1.0%	0.2%	1.2%	-1.6%	0.4%	2.0%

Note: The Charter and Traditional columns report the percentage point change from the prior year in the percentage of students with IEPs in the respective sector (charter schools or traditional public schools) that is directly attributed to each specific factor. The Change in Gap column reports the difference between the growth in the percentage of students with IEPs in the traditional and charter sectors that year. Calculations in particular cells differ in some cases due to rounding. The raw numbers of students used for these calculations are reported in Appendix A.

Table 3 reports the impact of each factor by year on the percentage of elementary-grade students with IEPs within each sector, and the impact of that factor on the special education gap that year. For example, between 2010 and 2011, the percentage of students with IEPs increased by 1.9 percentage points in the charter sector and 2.5 percentage points in the traditional public school sector, due specifically to students in each respective sector receiving a new IEP. That factor alone increased the special education gap by 0.6 percentage points (2.5 minus 1.9) that year. And so on.

Similar information for middle school grades is reported in Table 4. The mapping process reporting the total

number of students moving across sectors and experiencing classification changes is reported in the appendices.

It is worth noting that for each year and sector, the factors listed in tables 3 and 4 completely explain the changes in the percentage of students within that sector who have an IEP. For example, working from Table A1 in Appendix A, summing the “% Change” column for 2011 (impact of a factor on the change in the overall percentage of charter school students with IEPs) yields 1.3 percentage points, which is the total observed difference in the special education percentage for charter schools that year.

Table 5 Contribution to the Growth of the Special Education Gap in Denver Elementary Schools, by Factor

Cohort Enrolled in Kindergarten in October 2008							
Common Grade	K	1	2	3	4	5	Change
Year	2008	2009	2010	2011	2012	2013	2008-2013
Total Growth in Gap from Classification Changes		0.8%	1.4%	0.4%	0.4%	-0.5%	2.5%
New IEP		0.5%	1.1%	0.6%	0.5%	0.0%	2.6%
Declassified IEP		0.3%	0.3%	-0.2%	-0.1%	-0.4%	-0.1%
Total Growth in Gap from Student Mobility		-0.6%	1.3%	0.1%	1.0%	1.1%	2.9%
General Education Exit Denver Data		-0.1%	0.0%	0.5%	0.5%	0.5%	1.5%
IEP Exit Denver Data		-0.5%	0.6%	0.1%	0.4%	0.2%	0.8%
General Education Reenter Denver Data		0.0%	-0.1%	-0.2%	-0.1%	-0.1%	-0.4%
IEP Reenter Denver Data		0.0%	0.2%	0.3%	0.0%	0.1%	0.7%
General Education Exit Sector for Other Sector		-0.4%	-0.2%	-0.3%	-0.1%	0.1%	-0.9%
IEP Exit Sector for Other Sector		0.4%	0.6%	0.4%	0.3%	0.8%	2.6%
General Education Enter Sector from Other Sector		0.8%	1.3%	0.3%	0.9%	1.5%	4.8%
IEP Enter Sector from Other Sector		-1.0%	-1.1%	-1.0%	-1.1%	-2.0%	-6.2%
Total Gap in % Students with IEP	1.7%	1.9%	4.6%	5.2%	6.5%	7.2%	5.5%
Total Change in Gap		0.2%	2.7%	0.6%	1.3%	0.7%	

Figure 5 Summarizing the Contribution of Factors to the Growth in the Special Education Gap in Elementary Grades

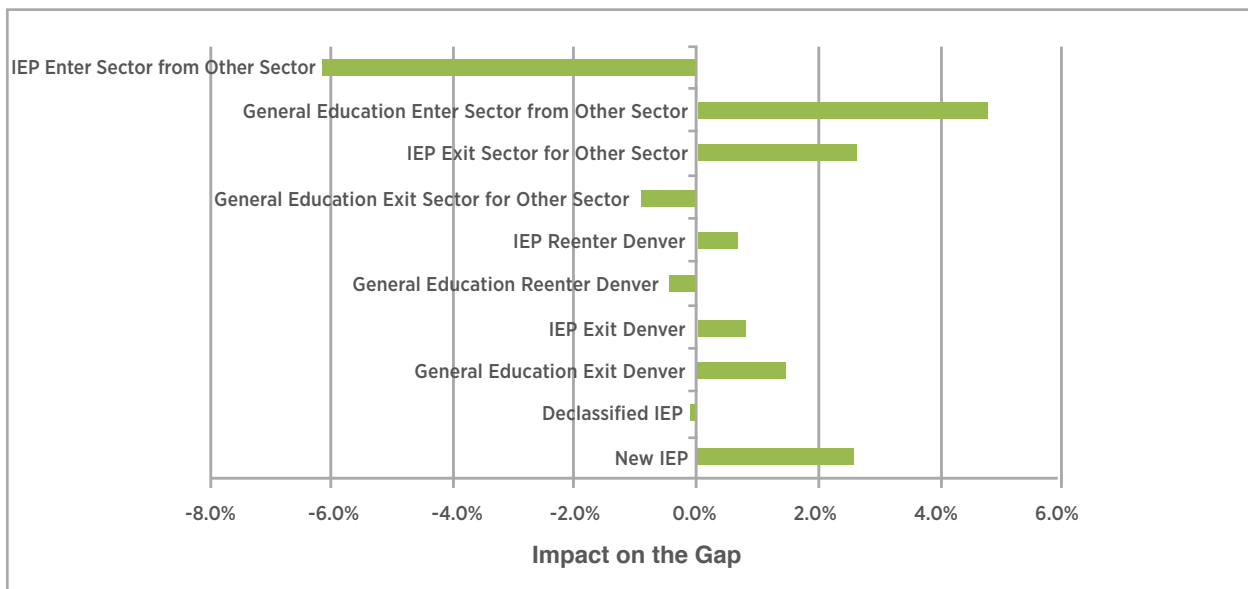
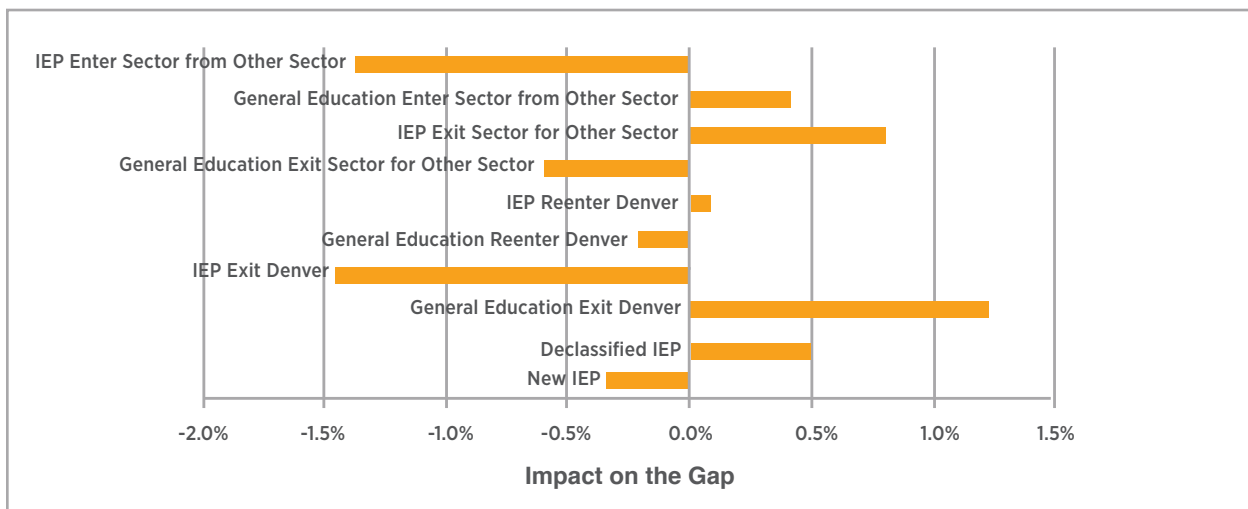
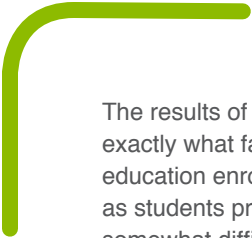


Table 6 Contribution to the Growth of the Special Education Gap in Denver Middle Schools, by Factor

Cohort Enrolled in Kindergarten in October 2008				
Common Grade	6	7	8	Change
Year	2011	2012	2013	2011-2013
Total Growth in Gap from Classification Changes		0.4%	-0.3%	0.2%
New IEP		-0.1%	-0.2%	-0.3%
Declassified IEP		0.5%	0.0%	0.5%
Total Growth in Gap from Student Mobility		0.1%	-1.2%	-1.1%
General Education Exit Denver Data		0.7%	0.5%	1.2%
IEP Exit Denver Data		-0.9%	-0.6%	-1.5%
General Education Reenter Denver Data		0.0%	-0.2%	-0.2%
IEP Reenter Denver Data		0.0%	0.1%	0.1%
General Education Exit Sector for Other Sector		-0.4%	-0.2%	-0.6%
IEP Exit Sector for Other Sector		0.8%	0.1%	0.8%
General Education Enter Sector from Other Sector		0.2%	0.2%	0.4%
IEP Enter Sector from Other Sector		-0.3%	-1.1%	-1.4%
Total Gap in % Students with IEP	4.4%	4.9%	3.4%	-1.0%
Total Change in Gap		0.5%	-1.5%	

Figure 6 Summarizing the Contribution of Factors to the Growth in the Special Education Gap in Middle School Grades





The results of the mapping process make transparent exactly what factors are causing differences in special education enrollment percentages for each sector as students progress through school. However, it is somewhat difficult to see from these results the way that each factor contributes to the special education gap. Table 5 reports the difference between the influence of a particular factor on the percentage of students with IEPs in traditional public schools and on the percentage of students with IEPs in charter schools, for the elementary cohort, and Table 6 reports the same for the middle school cohort. That is, the tables summarize the influence of each of these factors on the special education gap each year and over the entire time period considered. Figures 5 and 6 illustrate the differences during the entire grade spans under consideration.

As shown in Table 5, for elementary schools, the special education gap for the cohort of students who began kindergarten in October 2008 started at 1.7 percentage points in the initial year and grew an additional 5.5 percentage points by October 2013, when most students began fifth grade. About 46 percent of the growth in this cohort's special education gap by 2013 (2.5 percentage points) was due to differences in student classifications. In particular, students attending charter schools were less likely to receive a new IEP during this time than were students attending traditional public schools

The remaining 2.9 percentage points of the gap for the elementary-grade cohort through 2013 (54 percent) was due to factors related to student mobility. However, the impact of student mobility on the special education gap was not primarily driven by students with IEPs exiting charter schools. In fact, in each year of the analysis, more students with IEPs entered charter schools than exited them. Thus, the overall effect of students with IEPs moving within and out of the Denver school system was to *reduce* the special education gap by about 2 percentage points for this cohort by 2013.

Rather, student mobility influenced the special education gap primarily through the movements of general education students. In particular, general education students entering a new sector increased the special education gap by about 5.0 percentage points during this period. This happened because general education students were more likely to enter charter schools, which tended to decrease the percentage of all students enrolled in special education in the charter sector.

The story for middle school students differs considerably from that in elementary school grades. Among students who were enrolled in sixth grade in October 2011, the

special education gap actually declined by 1 percentage point. Thus, for middle school students, the difference in the probability of applying to a charter school appears to be the most important driver of the special education gap. Unlike in elementary schools, little of the change in the gap is due to differences in IEP classification rates. This is mostly because there are relatively few new classifications in middle school grades in either sector. Mobility of general education students also has little effect on the special education gap for middle school students. Rather, the gap declined in middle school grades primarily because a smaller number of students with IEPs attending charter schools exit than the number of students with IEPs who enter charter schools during this time period.

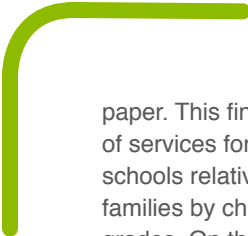
Summary and Conclusion

This paper uses data on the universe of public school students in Denver, Colorado, for a period of six years to describe the factors related to the special education gap between charter and traditional public elementary and middle schools. I confirm that the special education gap does exist: there is a significant difference in the percentage of students with disabilities in charter and traditional public schools that begins in kindergarten and grows substantially through eighth grade. Importantly, however, the factors that produce the gap are not those that are most often discussed in the policy conversation.

The descriptive analyses conducted in this paper suggest that charter schools counseling out students with disabilities does not appear to be a significant driver of the special education gap. In fact, students with IEPs are less likely to exit charter elementary schools than they are to exit traditional public schools. Further, more students with existing IEPs enter charter schools in non-gateway grades than exit them.

There is an initial special education gap in kindergarten because students with disabilities are less likely than students without disabilities to apply to charter schools. This difference in application rates also occurs in middle school and is the primary driver of the special education gap in sixth grade. This gap in sixth grade is mostly determined by a lower probability that students classified as having a specific learning disability will apply to attend a charter middle school.

That students with disabilities apply to charter schools at lower rates than do students without disabilities is an interesting finding that requires further explanation from future research of a different type than that offered in this



paper. This finding raises questions about the availability of services for students with special needs in charter schools relative to district schools, and the recruitment of families by charter schools, particularly in middle school grades. On the other hand, it is possible that parents whose children have already been receiving special education services within the traditional public school system are particularly (and perhaps understandably) reluctant to exit the traditional system for what might seem to them to be an experimental alternative in a charter school.

The special education gap in elementary school grades is largely produced by differences in classification and by movement of students across and out of the Denver school system as they progress through elementary school grades. The special education gap more than doubles during this time. The growth in the special education gap is most prominent in the disability category of specific learning disability.

Analysis of the cohort of students who entered kindergarten in October 2008 demonstrates that there are two main drivers for the growth of the special education gap in elementary schools: charter school students are less likely to be newly placed into special education than are students in traditional public schools, and the movement of general education students across sectors and out of the Denver school system tends to decrease the percentage of students with disabilities in charter schools relative to traditional public schools.

The finding that differences in new IEP classifications is a significant driver of the special education gap opens an important area for future research. Most importantly, the analyses in this paper are not capable of identifying whether the differences in classifications are due to the type of student who attends each sector, or if there is something about attending a charter school itself that reduces the probability that a student will be newly classified as having a disability. My prior research in New York City used enrollment lotteries in a sample of charter elementary schools and found evidence that attending a charter school decreases the probability that students will be classified into special education. Such an analysis is not productive at this time in Denver because lottery data go back only two years. I plan additional research in the near future that will use the enrollment lotteries to study this issue in Denver as well.

In the meantime, the fact that the special education gap at either the elementary or middle school level is not primarily driven by students with IEPs exiting charter schools at high rates has important policymaking consequences.

The results in this paper do not in any way imply that no students have been inappropriately removed or counseled out by a Denver charter school because of their disability. When such cases come to light, the charter school in question should be held accountable for such inappropriate actions.

But the enrollment numbers make clear that the movement of students with IEPs across sectors is not a major factor producing the special education gap. Thus, efforts to address the special education gap that focus on student exits or the counseling out of students with IEPs are unlikely to be productive.

For middle school grades, the results from this paper suggest that the only productive avenue for addressing the special education gap is to encourage more students with disabilities to apply for the charter sector in the sixth grade. On the other hand, the results in this paper suggest that there is perhaps no need to address the special education gap in elementary grades. In fact, doing so before we understand the reasons for differences in classification rates among existing students by the charter and traditional public school sectors could perhaps prove harmful.

The majority of the special education gap in elementary schools occurs due to the disproportionate growth of IEP rates in traditional public schools relative to charter schools as students progress through elementary grades. The reasons for this growth—the movement of general education students across sectors and the disproportionate likelihood that students in traditional public schools will receive a new IEP—are potentially not worrisome from the perspective of providing access to students with special needs. In fact, if it proves to be the case that charter schooling itself reduces the likelihood that a student will require special education services, then policy efforts meant to increase the percentage of charter school students with IEPs could lead to unnecessary disability classifications within the charter sector. Future quantitative and qualitative research is required to fully understand this issue.

Finally, it is notable that many of the results in Denver are consistent with previous findings using a similar analysis in New York City. Taken together, these papers suggest that there may be common features to the drivers of the special education gap in school systems nationwide. However, charter schools in each of these cities have been found by prior empirical research to be relatively effective at improving student achievement. This is not the case for charter schools in all other areas. Future research on the drivers of the special education gap in other effective charter sectors, and perhaps especially in less effective charter sectors, is warranted.

Appendix A. Calculating the Factors Affecting the Special Education Gap

Tables A1 and A2 report the numbers underlying the calculation of the impact of each factor on the percentage of students within a sector who have an IEP. (The percentages are reported in figures 7 and 8 in the main body of the paper.) I provide these numbers in order to better illustrate the calculation and to demonstrate that this procedure entirely explains the growth of the special education gap. The derivation of the formula for the calculations is presented in Appendix B.

For illustration purposes, I now describe the factors related to changes in the percentage of students receiving special education services in the charter sector between 2010–2011 and 2011–2012 for students who were in kindergarten in 2008–2009.

The top set of rows in Table A1 describe the percentage of students in the elementary cohort who were in special education each year, by sector. In October 2010, there were 380 students in charter schools from that cohort who did not have an IEP and 17 students who did have an IEP. In October 2011, there were 357 charter school students from that cohort who did not have an IEP (a decrease of 23) and 21 students in charter schools from that cohort who did have an IEP (an increase of 4). Thus, the percentage of students with IEPs from this cohort who were enrolled in charter schools increased about 1.3 percentage points, from 4.3 percent to 5.6 percent, that year. Table A2 provides the same information for the middle school cohort.

The bottom set of rows in Table A1 detail how each of the factors described in this paper contributed to the 1.3 percentage point increase in the special education percentage in charter schools between October 2010 and October 2011 for students in this elementary cohort. There were 7 students who received a new IEP between October 2010 and October 2011, which alone increased the percentage of students with IEPs in charter schools from the prior year by 1.9 percentage points. Two students who had an IEP in 2010 had their IEPs declassified by 2011, which alone decreased the percentage of students with IEPs in charter schools from the prior year by 0.5 percentage points. In addition, 23 general education students and 3 students with IEPs who had attended a charter school in 2010 had exited the Denver school system entirely in 2011; 6 general education students and 0 students with IEPs from the original cohort who had previously exited the system had returned to a charter school in the system in 2011; 34 general education students and 2 students with IEPs who had attended a charter school in 2010 were observed in a traditional public school in 2011; and finally, 33 general education students and 4 students with IEPs who had attended a traditional public school in 2010 were then observed in a charter school in 2011. Table A2 provides the same information for the middle school cohort.

Table A1 Deconstructing Growth in the Special Education Gap in Elementary School

Charter Schools										
	2008	2009	% change	2010	% change	2011	% change	2012	% change	2013
Total Students	424	377		397		378		423		526
General Education Students	404	356		380		357		397		490
IEP Students	20	21		17		21		26		36
% IEP	4.7%	5.6%		4.3%		5.6%		6.1%		6.8%
Difference IEP Enrollment		1 -48		-4		4		5		10
Difference General Education Enrollment				24		-23		40		93
New IEP		5	1.3%	3	0.8%	7	1.9%	9	2.1%	9
Declassified IEP		5	-1.3%	4	-1.0%	2	-0.5%	3	-0.7%	1
General Education Exit Sector Exit Data		83	1.0%	52	0.7%	23	0.3%	21	0.3%	22
IEP Exit Sector Exit Data		1	-0.3%	5	-1.2%	3	-0.8%	5	-1.1%	5
General Education Enter Sector Return to Data		0	0.0%	7	-0.1%	6	-0.1%	13	-0.2%	19
IEP Enter Sector Return to Data		0	0.0%	0	0.0%	0	0.0%	1	0.2%	1
General Education Exit Charter for TPS		36	0.5%	25	0.4%	34	0.4%	21	0.3%	29
IEP Exit Charter for TPS		2	-0.5%	3	-0.7%	2	-0.5%	2	-0.4%	6
General Education Enter Charter from TPS		71	-0.9%	93	-1.3%	33	-0.4%	75	-1.0%	133
IEP Enter Charter from TPS		4	1.0%	5	1.2%	4	1.0%	5	1.1%	12
Traditional Public Schools (TPS)										
Total Students	6,266	5,369		4,876		4,599		4,317		4,048
General Education Students	5,861	4,966		4,441		4,104		3,769		3,479
IEP Students	405	403		435		495		548		569
% IEP	6.5%	7.5%		8.9%		10.8%		12.7%		14.1%
Difference IEP Enrollment		-2		32		60		53		21
Difference General Education Enrollment		-895		-525		-337		-335		-290
New IEP		96	1.8%	89	1.8%	114	2.5%	113	2.6%	68
Declassified IEP		53	-1.0%	35	-0.7%	33	-0.7%	35	-0.8%	25
General Education Exit Sector Exit Data		817	1.0%	505	0.8%	377	0.7%	313	0.8%	250
IEP Exit Sector Exit Data		43	-0.7%	33	-0.6%	34	-0.7%	34	-0.7%	30
General Education Enter Sector Return to Data		0	0.0%	102	-0.2%	120	-0.2%	110	-0.3%	107
IEP Enter Sector Return to Data		0	0.0%	13	0.2%	15	0.3%	12	0.2%	14
General Education Exit Charter for TPS										
IEP Exit Charter for TPS										
General Education Enter Charter from TPS										
IEP Enter Charter from TPS										
General Education Exit TPS for Charter		71	0.1%	93	0.1%	33	0.1%	75	0.2%	133
IEP Exit TPS for Charter		4	-0.1%	5	-0.1%	4	-0.1%	5	-0.1%	12
General Education Enter TPS from Charter		36	0.0%	25	0.0%	34	-0.1%	21	-0.1%	29
IEP Enter TPS from Charter		2	0.0%	3	0.1%	2	0.0%	2	0.0%	6

Note: TPS = traditional public schools. Charter = charter schools.

Table A2 Deconstructing Growth in the Special Education Gap in Middle School

Charter Schools					
	2011	2012	% change	2013	% change
Total Students	1,596	1,422		1,352	
General Education Students	1,433	1,287		1,214	
Students with IEPs	163	135		138	
% Students with IEPs	10.2%	9.5%		10.2%	
Difference IEP Enrollment		-28		3	
Difference General Education Enrollment		-146		-73	
New IEP		12	0.8%	7	0.5%
Declassified IEP		16	-1.1%	7	-0.5%
General Education Exit Sector Exit Data		129	0.9%	83	0.6%
IEP Exit Sector Exit Data		19	-1.2%	12	-0.8%
General Education Enter Sector Return to Data		0	0.0%	7	0.0%
IEP Enter Sector Return to Data		0	0.0%	4	0.3%
General Education Exit Charter for TPS		112	0.8%	69	0.5%
IEP Exit Charter for TPS		16	-1.0%	8	-0.5%
General Education Enter Charter from TPS		91	-0.7%	72	-0.5%
IEP Enter Charter from TPS		11	0.7%	19	1.3%

Traditional Public Schools (TPS)					
	2011	2012	% change	2013	% change
Total Students	4,105	3,627		3,386	
General Education Students	3,505	3,105		2,925	
Students with IEPs	600	522		461	
% Students with IEPs	14.6%	14.4%		13.6%	
Difference IEP Enrollment		-78		-61	
Difference General Education Enrollment		-400		-180	
New IEP		26	0.7%	10	0.3%
Declassified IEP		21	-0.6%	19	-0.6%
General Education Exit Sector Exit Data		416	1.7%	250	1.1%
IEP Exit Sector Exit Data		88	-2.1%	55	-1.4%
General Education Enter Sector Return to Data		0	0.0%	64	-0.3%
IEP Enter Sector Return to Data		0	0.0%	14	0.4%
General Education Exit Charter for TPS					
IEP Exit Charter for TPS					
General Education Enter Charter from TPS					
IEP Enter Charter from TPS					
General Education Exit TPS for Charter		91	0.4%	72	0.3%
IEP Exit TPS for Charter		11	-0.3%	19	-0.5%
General Education Enter TPS from Charter		112	-0.5%	69	-0.3%
IEP Enter TPS from Charter		16	0.4%	8	0.2%

Note: TPS = traditional public schools. Charter = charter schools.

Appendix B. Deriving the Deconstruction Formula*

NOTATION

A_t = # Students with IEPs at time t

N_t = Total # students at time t

NC_t = # Newly classified students with IEPs

IN_t = # Students with IEPs entered sector

II_t = # Students with IEPs entered dataset into sector

RN_t = # General education students entered sector

RI_t = # General education students entered dataset into sector

B_t = # General education students at time t

DC_t = # Students with IEPs declassified

IX_t = # Students with IEPs exited sector

IE_t = # Students with IEPs exited dataset from sector

RX_t = # General education students exited sector

RE_t = # General education students exited dataset from sector

The fraction of students with IEPs in a given year is simply A_t/N_t , and the change between consecutive years is $(A_t/N_t) - (A_{t-1}/N_{t-1})$. This will build the measure.

Note the two laws of motion between years:

$$A_t = A_{t-1} + (NC_t - DC_t) + (IN_t - IX_t) + (II_t - IE_t)$$

$$N_t = N_{t-1} + (IN_t - IX_t) + (II_t - IE_t) + (RN_t - RX_t) + (RI_t - RE_t)$$

Now, we can solve for the decomposition in percent changes.

After some algebra, we arrive at:

$$\begin{aligned} \frac{A_t}{N_t} - \frac{A_{t-1}}{N_{t-1}} &= (NC_t - DC_t) * \frac{1}{N_t} + (IN_t - IX_t) * \frac{B_{t-1}}{N_t * N_{t-1}} + (II_t - IE_t) * \frac{B_{t-1}}{N_t * N_{t-1}} \\ &\quad - (RN_t - RX_t) * \frac{A_{t-1}}{N_t * N_{t-1}} - RI_t - RE_t * \frac{A_{t-1}}{N_t * N_{t-1}} \end{aligned}$$

* I am very grateful to Ryan Marsh for his help deriving this formula.

